



City West Water™

South East
Water



Yarra
Valley
Water



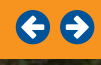
Melbourne
Water

Enhancing Life and Liveability

WATER FOR A FUTURE-THRIVING MELBOURNE

An overview of how Melbourne's metropolitan water industry is working together to secure water supplies for the next 50 years.

This document provides an overview of the common elements of *Urban Water Strategies* by City West Water, South East Water and Yarra Valley Water and the *Melbourne Water System Strategy* by Melbourne Water and outlines how the water corporations are preparing to meet the challenges of a growing city in a changing climate.



Aboriginal acknowledgment

City West Water, South East Water, Yarra Valley Water and Melbourne Water proudly acknowledge Aboriginal people as Australia's first peoples and the local Traditional Owners as the original custodians of the land and water on which we rely and operate. We pay our deepest respects to their Elders past, present and future.

We acknowledge the continued cultural, social and spiritual connections that Aboriginal people have with the lands and waters, and recognise and value that the Traditional Owner groups have cared for and protected them for thousands of generations.

In the spirit of reconciliation, we remain committed to working in partnership with local Traditional Owners to ensure their ongoing contribution to the future of the water management landscape while maintaining their cultural and spiritual connections.

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WHY WATER FOR A FUTURE-THRIVING MELBOURNE?



Melbourne and cities like it all over the world are being challenged to manage population growth alongside scarcer water resources due to a changing climate. Change is constant and, to thrive in the future, cities must design systems that not only meet the water and sewerage needs of our community today, but that are resilient to new or unexpected situations.

To make sure Melbourne continues to be a great place to live now and in the future, City West Water, South East Water and Yarra Valley Water (Melbourne's metropolitan retail water corporations) have developed *Urban Water Strategies* for their individual regions, as required by the *Statement of Obligations (General)*. These 50-year strategies (reviewed every five years) establish each corporation's strategic water resource and sewerage investments and actions to 2065 and align with the State Government of Victoria's *Water for Victoria* plan.

Water for Victoria is the strategic plan for management of our water resources, now and into the future to ensure we manage water to support a healthy environment, a prosperous economy and thriving communities.

To provide a system-level perspective on the challenges of climate change and population growth and to ensure that our water systems remain efficient and innovative, Melbourne Water (Melbourne's water wholesaler) has prepared the *Melbourne Water System Strategy*, as required by the *Statement of Obligations (General)*. It considers and

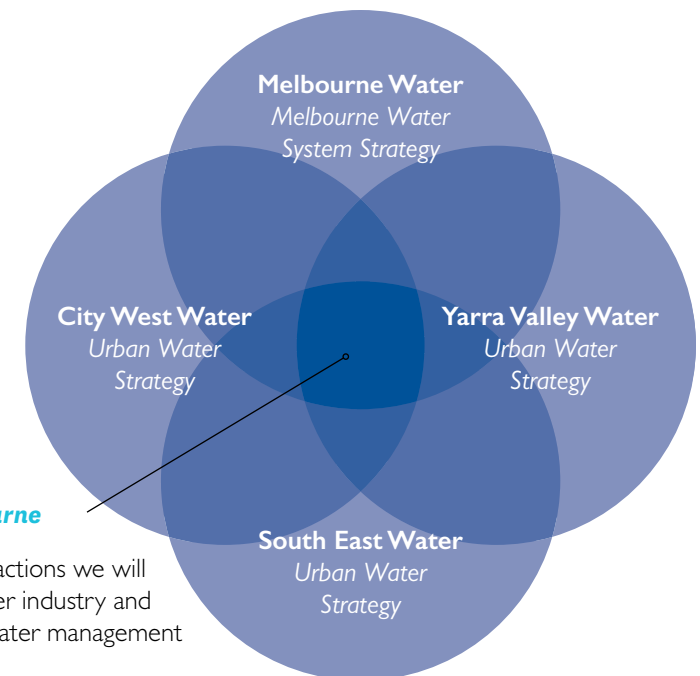
brings together actions planned by the metropolitan retail water corporations and also reflects the needs of regional corporations connected to Melbourne Water's water supply system (Western Water, Barwon Water, South Gippsland Water, Westernport Water and Gippsland Water), Southern Rural Water, and the Victorian Environmental Water Holder.

To complement this approach, Melbourne's metropolitan water industry (i.e. City West Water, South East Water, Yarra Valley Water and Melbourne Water) have collaboratively prepared this joint summary of their *Urban Water Strategies* and the *Melbourne Water System Strategy* that provides an overview of the initiatives that we will work on together for a consistent, customer focused and sustainable approach to our city's water management.

Water for a future-thriving Melbourne

This document is an overview of the actions we will be delivering as the metropolitan water industry and demonstrates the opportunities for water management across Melbourne.

Figure 1: What this document covers





Purpose of this report

The *Urban Water Strategies* and *Melbourne Water System Strategy* explain in detail how the metropolitan water industry will provide water and sewerage services in Melbourne to achieve a healthy environment, a prosperous economy and thriving communities in the face of key challenges.

This document provides an overview of how we will work together to deliver collaborative actions to manage the challenges and opportunities for water and sewerage management that affect the whole of Melbourne and the strong value we can bring when we work together across the metropolitan region.

This document highlights key areas where, as an industry, we will work together to achieve the best outcomes for Melbourne and its people. In addition, the individual retail water corporations know and understand the needs of their communities and the challenges that are unique to them. So for specific information about your local area, you can access your water corporation's *Urban Water Strategy* on their website.

For more information on water resource management across the whole of Melbourne and its surrounds, access the *Melbourne Water System Strategy* on Melbourne Water's website.

Vision

This document aligns with the vision set by the Victorian State Government in *Water for Victoria*, which outlines its approach for managing our available water resources now and into the future:

“Water is fundamental to our communities. We will manage water to support a healthy environment, a prosperous economy and thriving communities, now and into the future.”

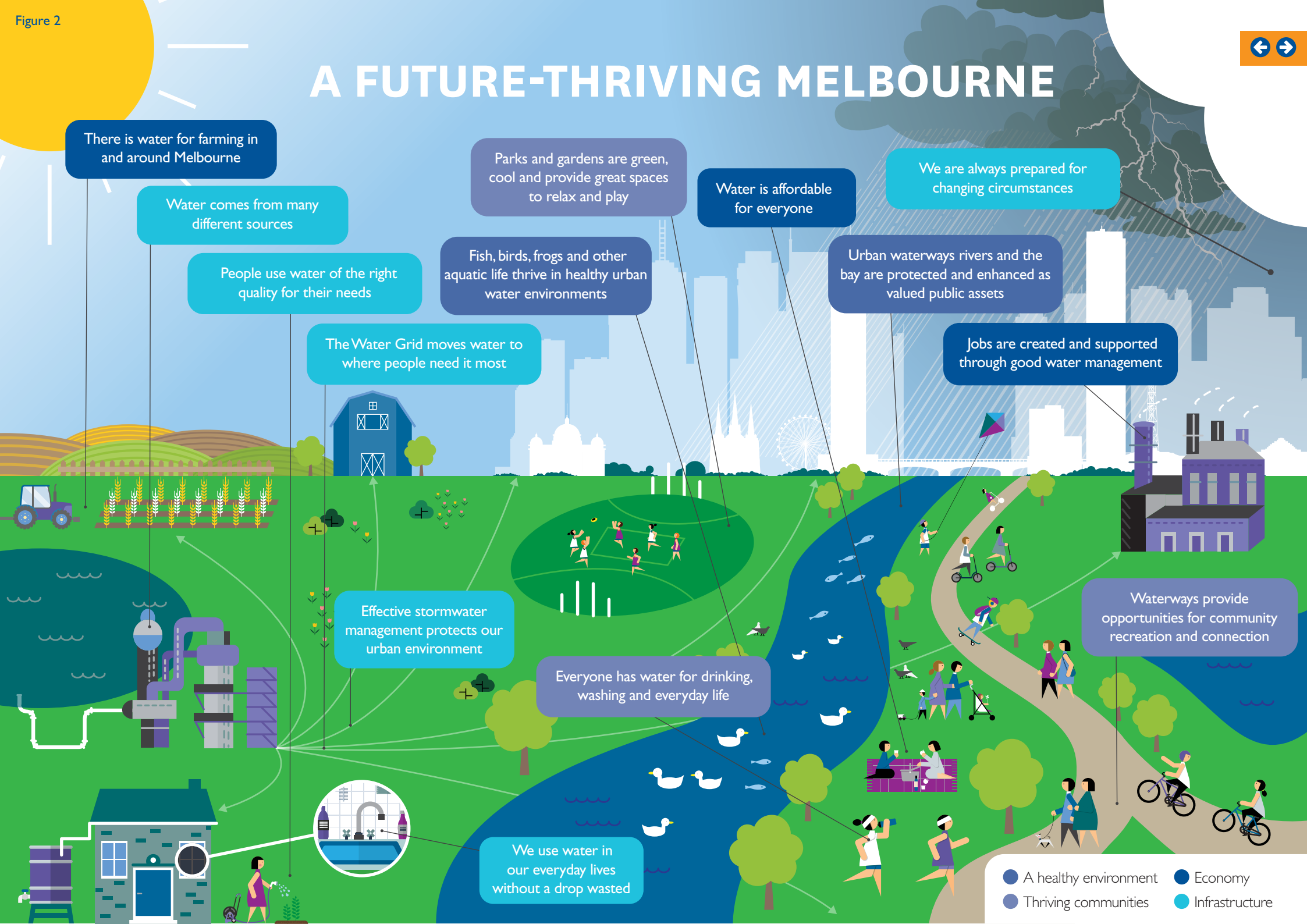
This vision closely aligns with community expectations for our water services as shown in this pictorial representation in Figure 2.

Water is a key part of what makes our city a great place to live, even in ways that we may not realise. Water has an important function beyond the obvious supply to our houses. It also plays a critical role in helping manage the impacts of climate change by keeping our parks and gardens green and the trees in our streets alive and thriving. It helps to keep our rivers clean and the animals and plants that depend on them healthy.

Figure 2



A FUTURE-THRIVING MELBOURNE



There is water for farming in and around Melbourne

Water comes from many different sources

People use water of the right quality for their needs

The Water Grid moves water to where people need it most

Fish, birds, frogs and other aquatic life thrive in healthy urban water environments

Parks and gardens are green, cool and provide great spaces to relax and play

Water is affordable for everyone

We are always prepared for changing circumstances

Urban waterways rivers and the bay are protected and enhanced as valued public assets

Jobs are created and supported through good water management

Effective stormwater management protects our urban environment

Everyone has water for drinking, washing and everyday life

Waterways provide opportunities for community recreation and connection

We use water in our everyday lives without a drop wasted

- A healthy environment
- Economy
- Thriving communities
- Infrastructure

HOW WE MANAGE WATER IN MELBOURNE



Melbourne Water provides wholesale water, sewerage and other services to the retail water corporations and other customers. The retail water corporations deliver water to the community.

Water is delivered to customers via a network of water supply reservoirs, distribution pipelines and the Victorian Desalination Project. The sewage from our household toilets, showers and kitchens, and commercial and industrial uses is removed and treated using a different network of pipelines and sewage treatment plants.

The water supply system managed by Melbourne Water also supplies water to some regional water corporations including Western Water and Barwon Water. You can visit their websites for more information on their individual *Urban Water Strategies*.



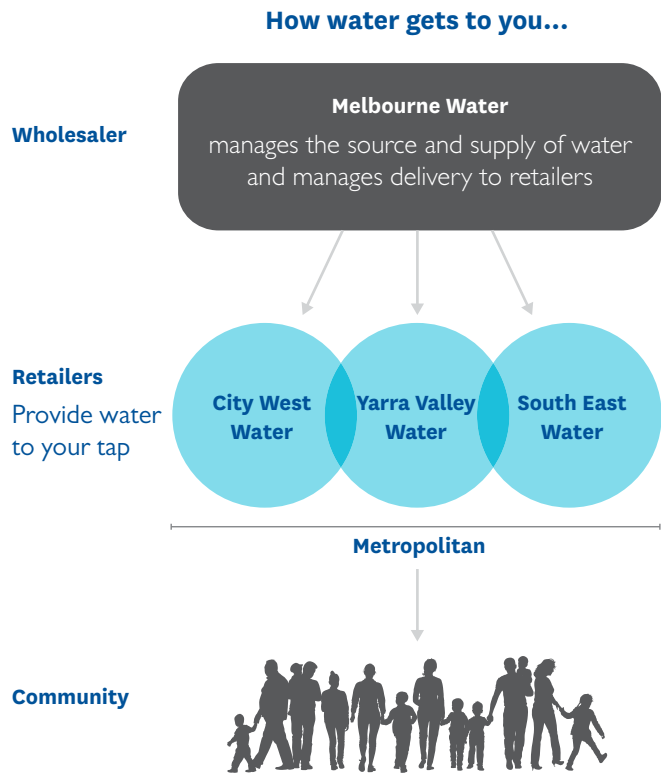


Figure 3

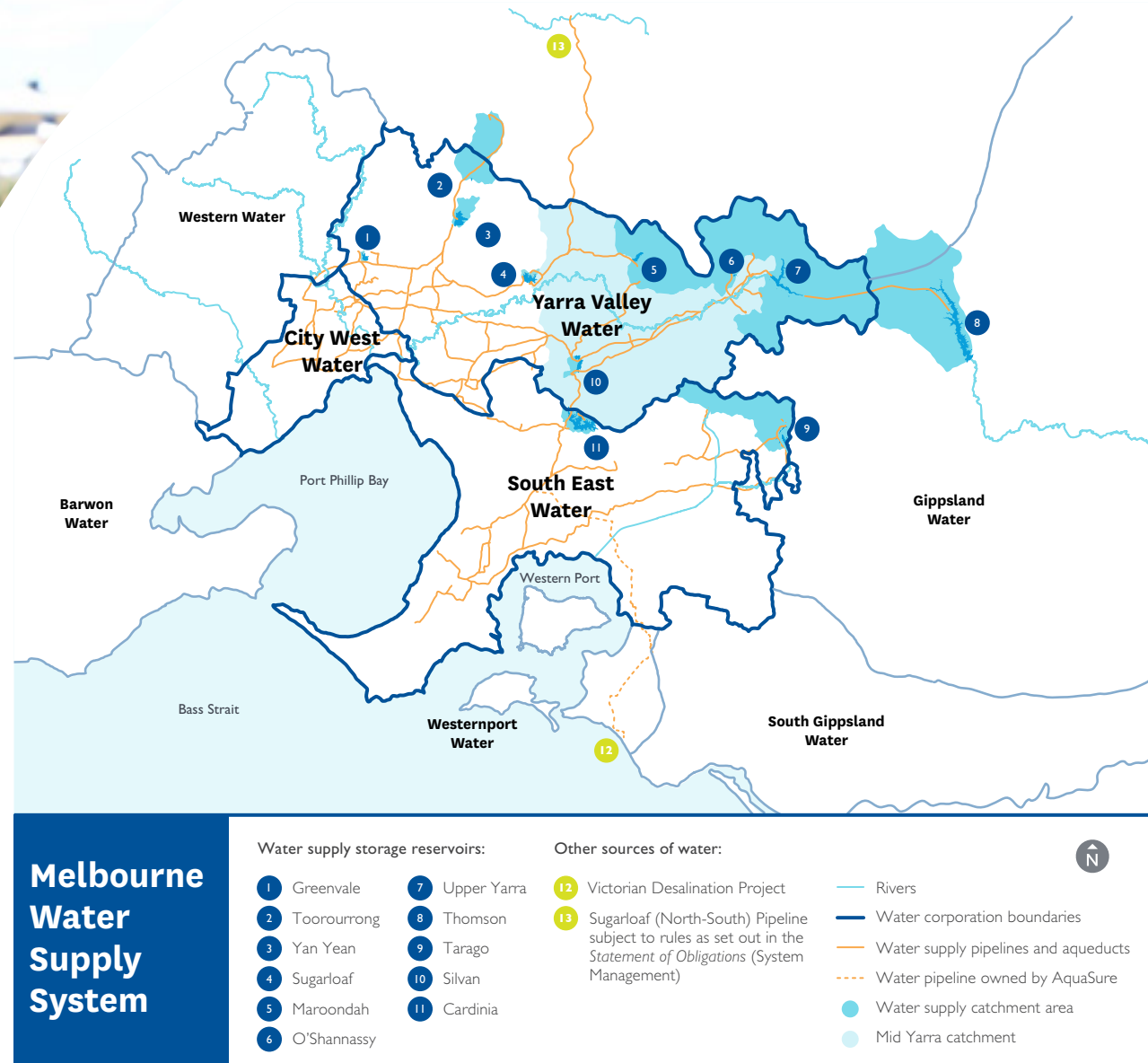


Figure 4

THE WATER CYCLE



Rain

Rain falls across the region, on urban areas and our water supply catchments. When it rains, water is used by vegetation, evaporated into the atmosphere or stored in the soil. The remaining rainfall runs off, or infiltrates into the ground before entering our waterways where some is harvested for use and the rest flows into the bays.



Water supply system

The water supply system includes protected and open water supply catchments, reservoirs and weirs used to harvest and store water; the Victorian Desalination Project, and the networks of rivers, pipes and pumps used to transfer water across the region to our customers.



Uses of water

Water is used in Melbourne for a range of residential, commercial, institutional, agricultural and industrial purposes. During the Millennium Drought from 1997 to 2009, total water consumption in Melbourne decreased by more than 30 per cent despite population growth of over 500,000 people in Melbourne during that time.



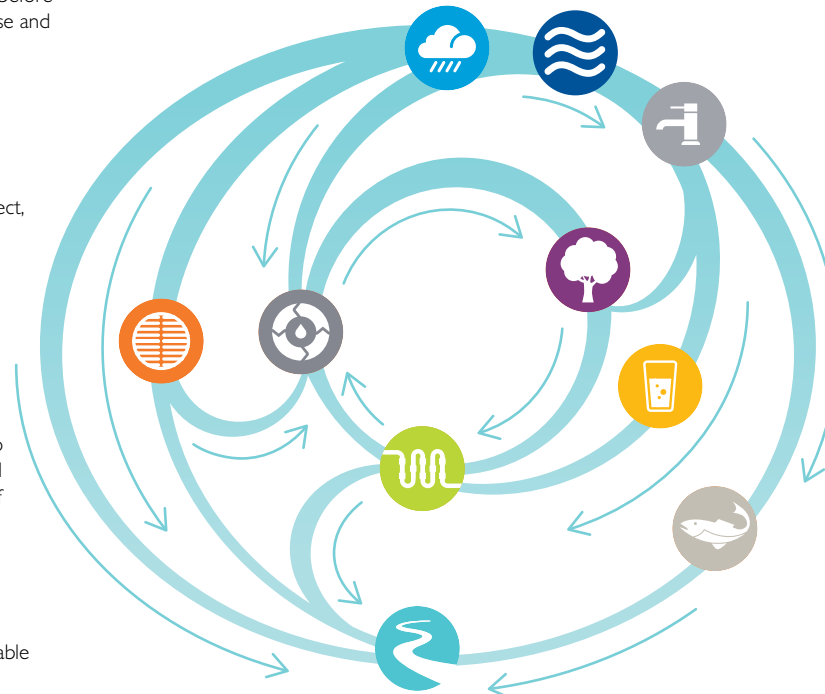
Non-drinking uses of water

Uses like flushing toilets, washing clothes and watering gardens, parks and sports fields do not need water suitable for drinking. These uses can be supplied with treated rainwater, stormwater and recycled water.



Desalination

The Victorian Desalination Project provides rainfall independent drinking water for Melbourne. It can deliver 150 GL per year, which is about one third of our current demand. We operate the water supply system, including the Victorian Desalination Project, to keep a buffer of water in storage, subject to cost, for maintaining supply throughout future drought and extreme events.



Drainage system

When it rains on urban areas, the drainage system, (which is managed by Melbourne Water and local councils), captures stormwater and channels it into waterways and bays. This helps to manage the impacts of urban flooding.



Sewerage system

Most uses of water generate sewage that needs to be managed. The sewerage system captures sewage and transfers it to sewage treatment plants, where contaminants are removed so that the treated sewage can either be used as recycled water; or safely discharged into waterways, the bays or Bass Strait.



Rainwater, stormwater and recycled water

Rainwater and stormwater are sometimes harvested and used for some non-drinking uses. Similarly, recycled water can be used for some non-drinking uses. This reduces the volume of water needed from the water supply system, and reduces the volume of stormwater and treated sewage discharged into waterways and bays.



Environmental water

Environmental water is released from our water supply systems into waterways to ensure they get enough water to support environmental values. Although it is primarily planned and delivered to support environmental values, environmental water can also help to support recreational and cultural values, as shared benefits.



Waterways and bays

Waterways and bays across the Port Phillip and Western Port region support a range of economic, environmental and social values. The volume and quality of water in our waterways and bays have been changed as a consequence of urban development across the region – we need to work to manage the impacts of these changes on the values our waterways and bays support.



Figure 5

CHALLENGES TO BE ADDRESSED



Our changing needs

Melbourne's population is set to double by 2065 within the fixed urban growth boundary set by *Plan Melbourne* as seen in Figure 6. This means our city will become increasingly dense over the coming decades. As set out in *Plan Melbourne* growth will be both in the outer regions of Melbourne such as the Western and Northern growth regions, and urban renewal precincts such as Fishermans Bend. This presents an opportunity to ensure that these new suburbs are designed to be smart and efficient.

With approximately 70 per cent of new growth expected in areas that already have people living in them, we can expect to see more apartments and shrinking block sizes.

Some of these changes can have a positive impact on water use, like using less water as homes become smaller, less outdoor water use in gardens, more efficient fittings installed at construction, and houses built to higher efficiency standards. These all decrease our per person water use as shown in Figure 7.

However, these same changes can also provide challenges for water and liveability. With smaller block sizes and gardens, we could see less urban greening which could increase urban heat. More houses create more hard surfaces that create stormwater runoff, leading to more potential flood risk and damage to our rivers and creeks.

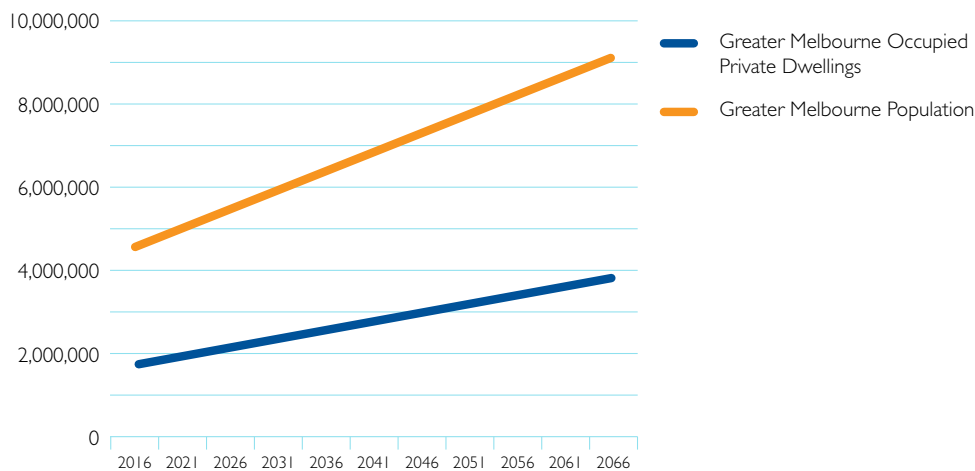


Figure 6: Population growth over time

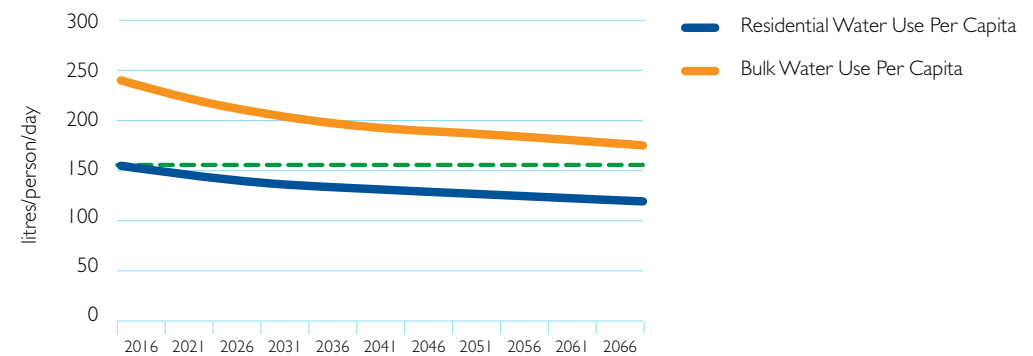


Figure 7: Water use over time

How water is currently used in Melbourne

Two-thirds of our water use is for residential use as shown in Figure 8. So while our household water use is becoming more efficient, growing populations will result in increases to water demand from our system as shown in Figure 9.

More people living closely together means public open spaces become more valuable, and increases our need to keep them healthy and green (which requires water). We can use non-drinking water for some irrigation (like recycled water), but even our demand for these alternative water types will change over time.

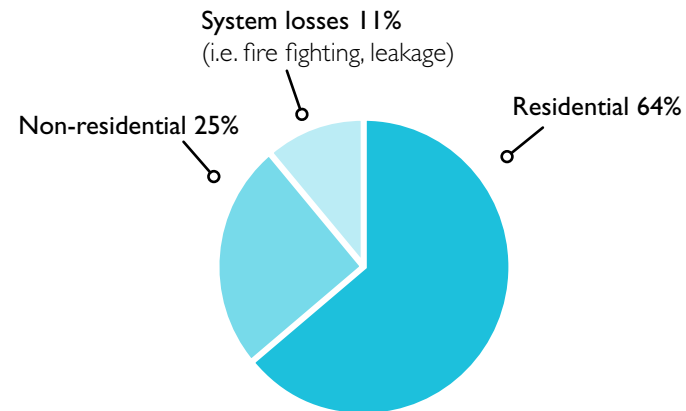


Figure 8: Water use breakdown for 2016

How we manage your sewerage

In a similar manner to water, sewerage needs to be transferred around Melbourne, away from customers to sewerage treatment plants.

As our population and water use increase, so too will the volume of sewerage that is generated and subsequently treated as shown in Figure 9. We will work together to deliver the Melbourne Water Sewerage Strategy by September 2018 to review our plans for managing these challenges.

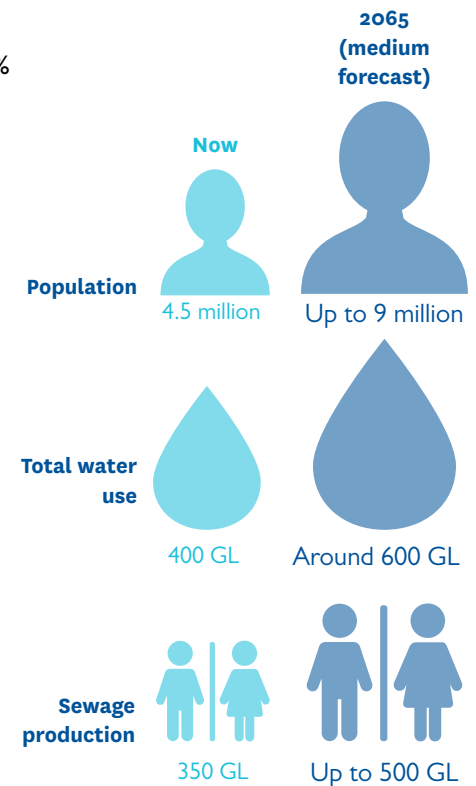


Figure 9: Current and future forecasts



Action:

Deliver the Melbourne Water Sewerage Strategy by 2018.

Community expectations

As our water needs change over time, we also need to be aware of what our different communities expect and value.

We've listened to our customers and communities through a number of forums and the feedback we received gave us some important insights.

Figure 10 shows that while communities care most about water for everyday living, they also care about water for recreation and the environment. We recognise that there are range of preferences for essential and discretionary water uses, and we should have the water we need for all our customers needs and choices. We understand that the cost of water is important to many of our customers and we need to manage our water services with this in mind.

We learned that our customers want:

- Affordable water services
- A proactive and adaptive planning approach
- Water corporations to promote water efficient behaviours
- Mild water restrictions when necessary, rather than paying more to avoid them
- To see increased use of recycled water and stormwater, although drinking water to still come from the water supply system
- Expansion of desalination capacity to be the last resort
- Better, more proactive and more engaging communication

» Action:

Continue to engage with the community to ensure we reflect their needs and expectations in our water supply planning.

» Action:

Engage the community about the value of our diverse water supply system to build confidence and trust in the services we provide both now and in the future.

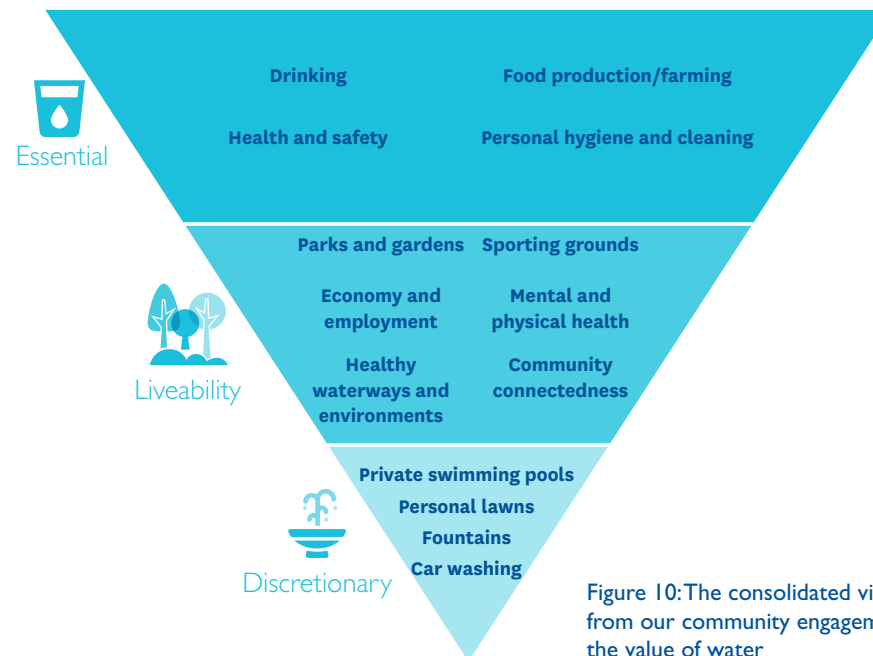


Figure 10: The consolidated views from our community engagement on the value of water

Our Indigenous communities – part of our diverse city

Victoria's Traditional Owners have managed land and water sustainably over thousands of generations and have a strong connection to water for cultural, spiritual and economic reasons. Connectedness to land, waters and resources on Country is important for Aboriginal health and wellbeing.

The State Government has recognised this connection with a clear roadmap to include Aboriginal values in water planning through the state-wide Aboriginal Water Program. This program and its government reference group will provide the right opportunity to hear Aboriginal voices at the table for water-related decisions.

We have worked as a water industry to map our current and future services against these values to ensure we engage on matters of most relevance and where we can learn from and work with Traditional Owners.



Action:

We will work collaboratively across the water sector to develop long-term meaningful relationships with the Traditional Owners in the metropolitan region to better integrate cultural water needs into water resource management, and ensure their contribution to the future of water management. We aspire to create relationships and actions that enable the co-design, co-development and co-management of water resources.

Our changing climate

Our climate is changing. The last 30 years has seen historical changes in temperature (see Figure 11) and rainfall patterns across our state¹, and we expect our climate to continue changing over the coming decades. The Department for Environment, Land, Water and Planning have developed the *Guidelines for Assessing the Impact of Climate Change on Water Supplies in Victoria*, which set out the climate scenarios that have been used in the development of the *Melbourne Water System Strategy*.

These changes have implications for water resource planning, as Victoria becomes warmer and drier, there will be less runoff entering our water storage reservoirs. For more information on this refer to the *Melbourne Water System Strategy*. More water may be used by the community as they stay cool, hydrated and maintain gardens; waterways may have less water across Melbourne and the surrounding region, including the waterways that flow into our water storage reservoirs; and the risk of bushfires in our water supply catchments may continue to increase.

The water industry is a significant contributor to greenhouse gas emissions, largely from the direct emissions from sewage treatment. As such, the metropolitan water industry is working together to minimise the impacts of future climate change by reducing our greenhouse gas emissions, consistent with the direction set by *Water for Victoria*.

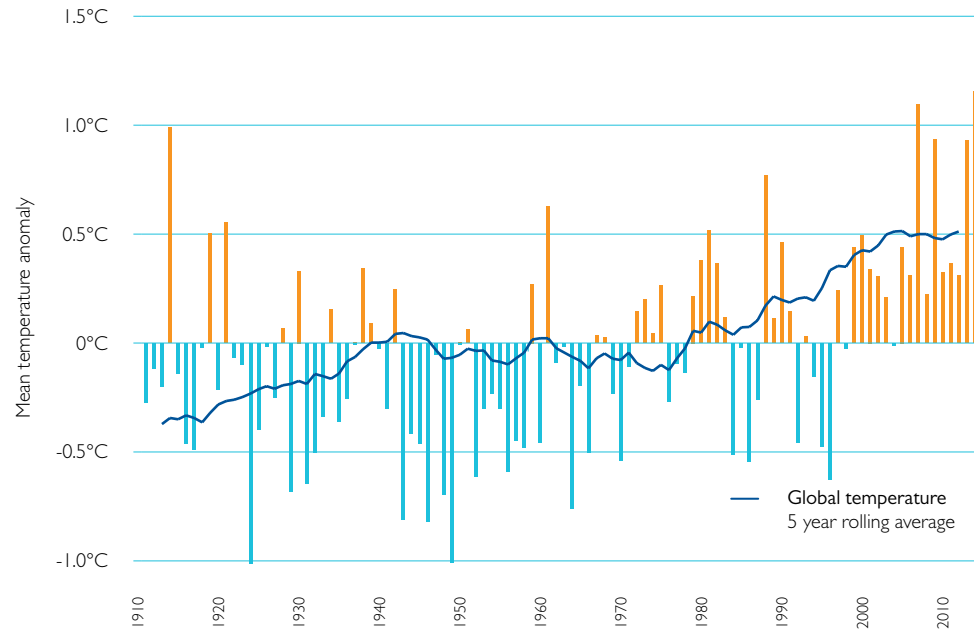


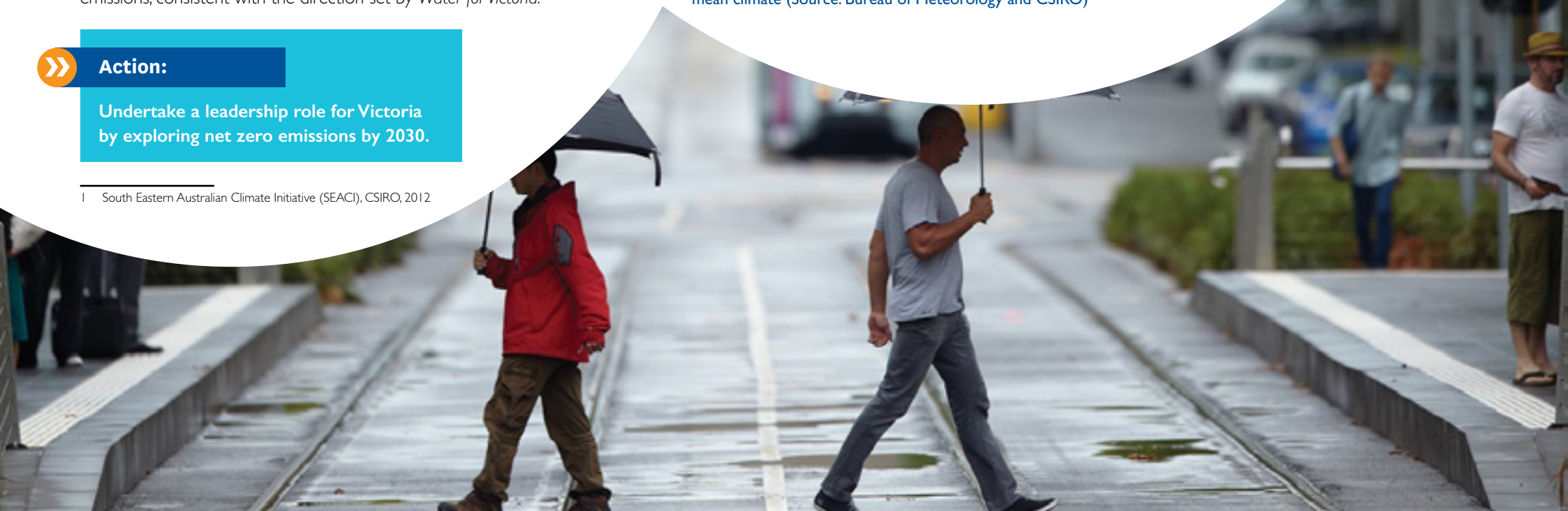
Figure 11: Annual mean temperature anomaly for Victoria based on 1961-1990 mean climate (Source: Bureau of Meteorology and CSIRO)



Action:

Undertake a leadership role for Victoria by exploring net zero emissions by 2030.

¹ South Eastern Australian Climate Initiative (SEACI), CSIRO, 2012



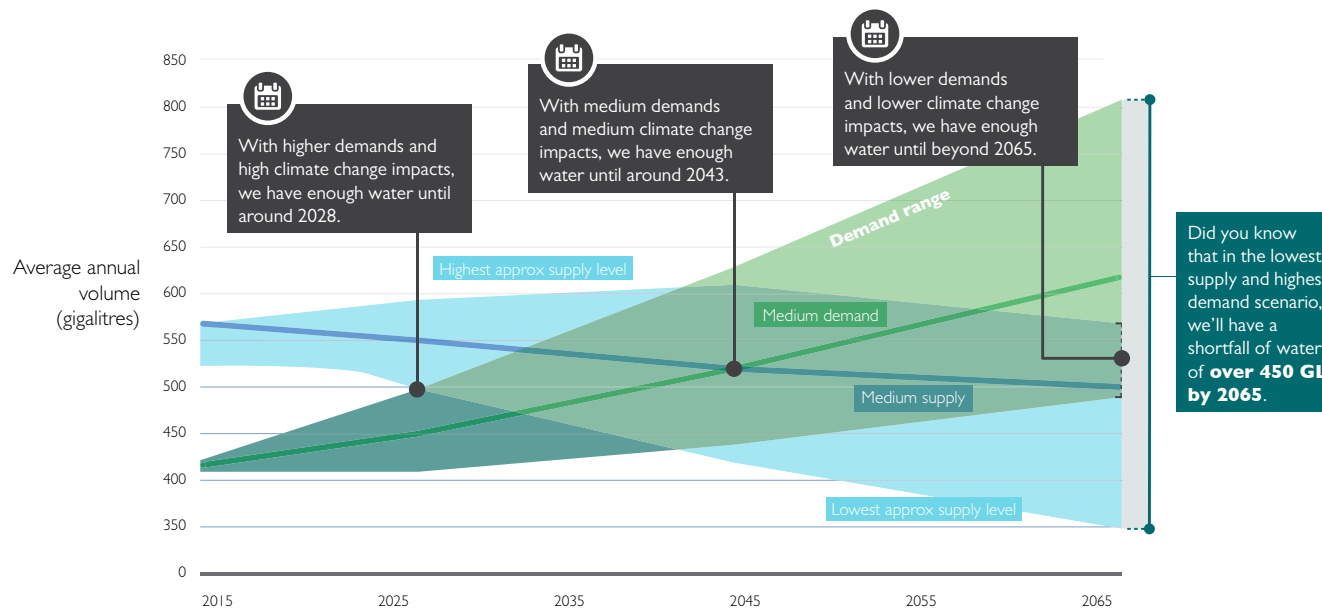
What does this mean?

Melbourne Water and the retail water corporations will continue working over the long-term to ensure that enough water will be available to meet the needs of the community. The *Urban Water Strategies* and *Melbourne Water System Strategy* outline how we will manage water for the community based on a long-term outlook of 50 years considering a range of climate scenarios and future water needs. This helps ensure that our planning accounts for all the potential factors that could affect how much water we may have and its likely uses.

Population growth, the potential impacts of climate change, and other factors that can influence the supply and demand for water are uncertain as seen in Figure 12.

Water industry projections suggest that on the one hand, it is possible that the demand for water could exceed the capacity of our existing sources of water by around 2028, with potential shortfalls of more than 450 GL per year by 2065. On the other hand, it is possible that demand might not exceed the capacity of our existing sources of water until beyond 2065. This uncertainty highlights the need to manage our water resources adaptively in response to the latest observations and projections with regard to our climate, population and water use that is available at any given point in time.

Supply and demand scenarios in Melbourne



Did you know?

1 gigalitre (GL) is 1 billion litres of water, which is the equivalent of approximately 400 Olympic size swimming pools.

Figure 12

Water in our environment

Our waterways have natural patterns of high and low flows driven by annual and seasonal variation in rainfall. Plants and animals rely on these natural flow patterns for survival and reproduction.

Environmental water is released from water supply reservoirs to help replicate natural patterns of high and low flows before the construction of dams, weirs and channels to support the plants and animals that depend on them. Environmental water needs to be released in the right volumes, at the right time, and at the right quality for it to be effective.

Environmental water is delivered into several river systems in Melbourne and the surrounding region, including the Thomson, Yarra, Tarago, Werribee and Maribyrnong river systems. We need to ensure these river systems continue to get the water they need to stay healthy as our population grows and our climate changes.

Did you know that in the lowest supply and highest demand scenario, we'll have a shortfall of water of **over 450 GL by 2065**.

OUR RESPONSE TO UNCERTAINTY



Given the complex challenges we are facing, the metropolitan water industry has collectively identified the following key responses to achieve our future vision for Melbourne:

- an adaptive management framework
- a diverse portfolio of supply and demand options
- making appropriate investments.

These responses link together and support each other to create a dynamic pathway through the changing conditions ahead, as shown in Figure 13.

Each water corporation's individual *Urban Water Strategy* and the *Melbourne Water System Strategy* have been structured differently to reflect the key challenges and perspectives faced by each individual corporation and the communities they serve. However, these following three response areas reflect those that we, as an industry, are working on together:

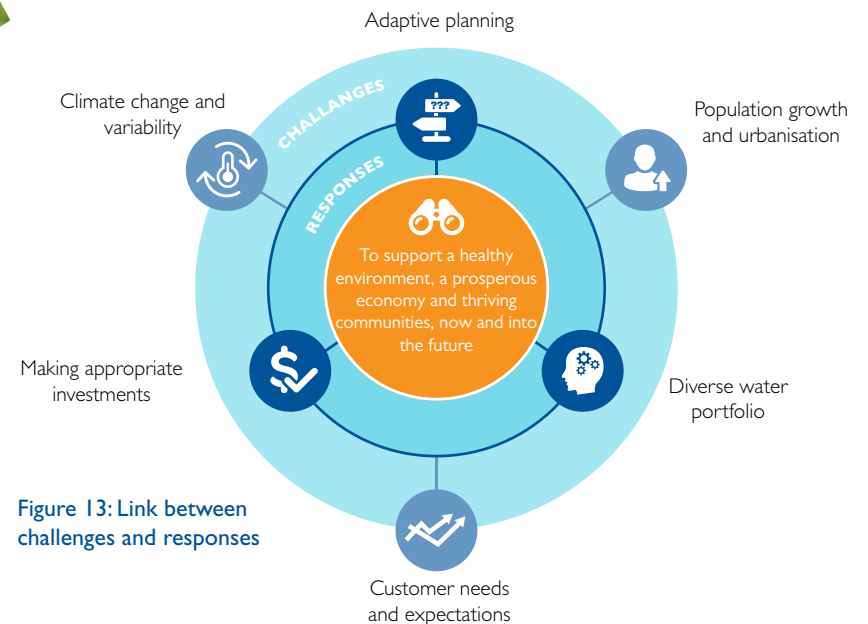


Figure 13: Link between challenges and responses

WHAT THE FUTURE LOOKS LIKE IF WE GET THIS RIGHT



The responses laid out in this document exist to address the growing uncertainty from the pressures on our water system. These approaches allow us time and offer the best available information so we can make smart decisions. This means that we benefit by:

- having better investment choices available
- delivering a more innovative and resilient system
- providing more opportunities for community feedback and engagement
- less potential cost impact on customers
- improved confidence in the long term value of our decisions.

This leads to better outcomes for the community and our city and helps us achieve our vision of a healthy, prosperous, liveable Melbourne.

ADAPTIVE PLANNING



The uncertain nature of future climate change, population growth and needs and expectations of the community means we need to manage our system adaptively as new information becomes available.

What is adaptive management?

Adaptive management is a structured process to feed new information into decision making through ongoing monitoring and evaluation of the situation. This approach is suited to managing situations where the future is uncertain, and where new information that could change decisions is likely to emerge in the future.

Adaptive management is an integral part of the planning process for water management in Melbourne. There are a number of short and long-term processes (as detailed in Figure 14) that are continuously reviewed against the latest quality information on climate change, population growth and water usage.

The preparation of the annual *Water Outlook* is a great way to check in on our system to understand how we are tracking and what actions we might need to take over the next 12 months to three years.

The desalinated water order advice is another annual process that we undertake. This is to help inform the State Government's desalinated water order decision by providing technical and operational advice about the desalinated water order volumes needed to maintain our customers needs.

How does the *Water Outlook* work?

The annual *Water Outlook*, published annually on 1 December on each water corporations' website, considers the performance of the water supply system and trends in how water is being used. It considers the potential for low stream flows in drought years and assesses current storage levels against three pre-defined zones (as detailed in Table 1) to establish whether the supply system can deliver the volume of water needed in the short-to-medium-term.



Adaptive Management Plan

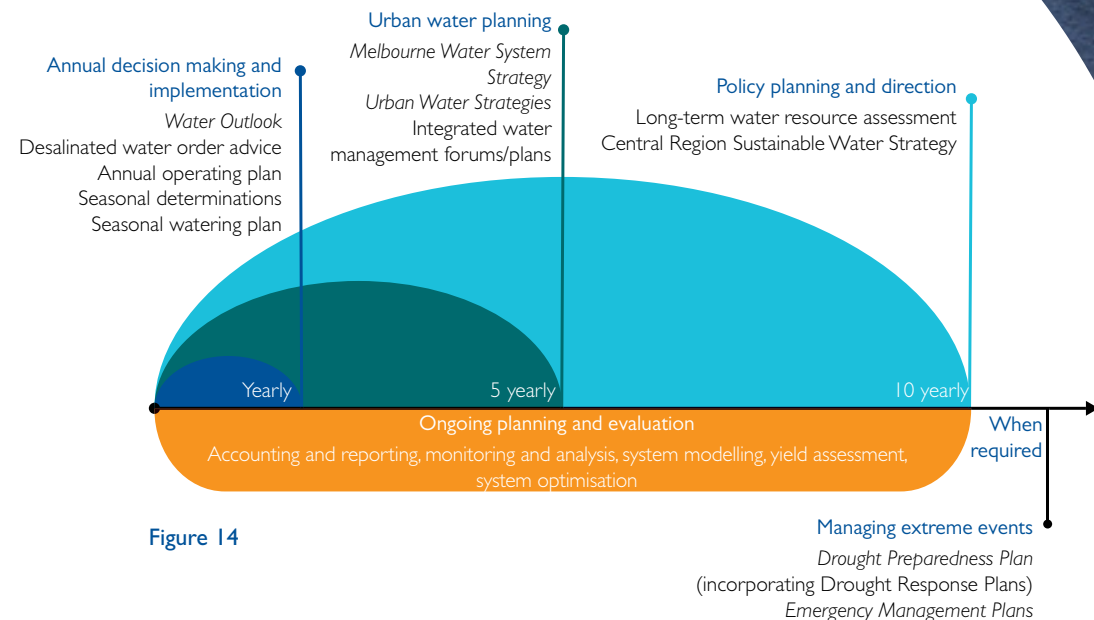


Figure 14

Table 1 Water outlook zones

Zone	Descriptor	Action point at 30 November each year
High	Optimising supplies - More than five years supply available above low zone - Use of the Victorian Desalination Project to build storage levels as a buffer against long term drought	Melbourne's storage levels greater than 60 per cent full
Medium	Take action - Up to five years of supply available above the low zone (includes operating the Victorian Desalination Project at full capacity)	Melbourne's storage levels less than 60 per cent and greater than or equal to 40 per cent full
Low	Emergency circumstances - Up to two years of supply available with restricted demand (includes full use of the Victorian Desalination Project)	Storage levels less than 40 per cent full

**Action:**

Publish *Water Outlooks* to meet community expectations to be more proactive, engaging and accessible.

**Action:**

Review desalinated water order process in consultation with the Department of Environment, Land, Water and Planning to ensure alignment with adaptive planning and customer needs by September 2017.

**Action:**

Review the *Drought Preparedness Plan* every five years and work with councils to identify priority public assets to meet liveability outcomes by March 2018.

Drought Preparedness Plans

The retail water corporations prepare Drought Preparedness Plans (which incorporate the Drought Response Plan) which set out the actions to prepare for and respond to periods of water shortage. Some of these actions include identifying the public assets (such as parks, gardens, trees, etc.) that require watering at all times to ensure they maintain liveability outcomes.



A DIVERSE WATER PORTFOLIO



Our city's diverse water portfolio features a number of ways to manage the water we have available. This includes using water efficiently as well as considering the many sources of water available to us such as rainwater, recycled water, stormwater and desalinated water and how using these for specific purposes can help reduce demand on our precious drinking water supplies.

What is water efficiency?

Water efficiency is using less water without impacting on liveability.

Water efficiency is a key element of our diverse portfolio of options for managing our system over the next 50 years. Melburnians have already taken impressive steps in reducing water use by using efficient shower heads, clothes washing machines, dual flush toilets and trigger nozzle hoses. So much so, that our water needs today – even with an increased population – are less than they were 15 years ago. Household water use has reduced from more than 247 litres per person per day in 2000-01 to less than 170 litres per person per day in 2015-16.

The retail water corporations have also worked with their large industrial and commercial water users to minimise their water use. Programs including the Water Management Action Plan (WaterMAP) have made a substantial difference to the amount of water used for commercial and industrial purposes.

Target 155

The State Government has recently re-launched the Target 155 program which is a voluntary water efficiency program to encourage metropolitan Melbourne householders to limit their consumption to 155 litres per person per day.



Action:

We commit to supporting the efficient use of water across the community. By 2022, we are forecasting demands of:

- 230 litres per person per day for total drinking water use across Melbourne
- 150 litres per person per day for residential drinking water use across Melbourne

Performance against these forecasts and any actions needed to keep observed demands consistent with these forecasts will be published each year in the *Water Outlook*.

Digital metering for households and businesses

City West Water, South East Water and Yarra Valley Water are working together to explore digital water meters for households and businesses.

Our research shows Melburnians expect their water utilities to continually find efficiencies to better manage our water. Digital technology could be the next era to help us manage our water more sustainably, now and in the future, in an increasingly drier climate and with a growing population.

Digital water meters will help identify leaks, within the customer's property and in our networks, so they can be fixed quickly, saving water and money.

Digital water meters can provide customers with timely information on their water usage and bill so they can make informed choices about their water consumption and avoid surprises.

In addition to the retail water corporations Melbourne Water is also considering the opportunities presented by emerging digital metering technologies.

Alternative sources of water

Alternative sources of water means any water that doesn't come from our water storage reservoirs or the Victorian Desalination Project. It includes sources of water like recycled water, stormwater, rainwater and groundwater that is treated so that it is appropriate for the purposes it is used for. Currently, these water resources are most commonly used for purposes that do not require the highest quality water, like watering gardens and flushing toilets.

There are already many examples of alternative water use across Melbourne including private rainwater tanks used in many homes and larger schemes in Melbourne's growth areas in the north, west and south east where recycled water is provided to homes for use in gardens, toilets and the laundry.

A number of Melbourne parks and gardens are also irrigated with alternative sources of water, like the Royal Botanic Gardens Melbourne. Its new Working Wetlands Stormwater Harvesting project will reduce its demand on drinking water by 40 per cent.

The amount of recycled water and stormwater available for use across our city far outweighs what we can use. With our increasing population, this is forecast to grow. In 2015/16, across Melbourne around 350 GL per year of sewage and 350 GL per year of stormwater were generated, and only a small proportion was reused. A key constraint with stormwater reuse is the timing and capture. Rainfall events can occur quickly which means large storages are often required to capture this water, which can be difficult to locate and costly. Even given this, recycled water and stormwater have potential as resources for the future subject to assessment of their effectiveness and affordability.



Action:

Continue to work collaboratively across the industry to assess the benefits of digital metering for our communities.



Action:

We forecast the delivery of 25 GL per year of alternative water by 2065 in line with our current plans.
Our aim is to contribute up to a further 40 GL per year where business cases demonstrate value to our communities.

OUR MANY WATER SOURCES

Recycled water can be used to irrigate farms and parks, flush toilets and for some industrial processes. Using recycled water for these purposes helps us reduce demand on drinking water. We currently use approximately **6 GL per year** of recycled water for fit-for-purpose uses.

Water from our **supply catchments** from catchment areas is stored in 10 major reservoirs that have a combined capacity of **around 1,800 GL**.

Rainwater is the runoff from roofs before it enters drains.

Stormwater is the water that runs off impervious surfaces like roads and footpaths when it rains, that would have seeped into the ground and been taken up by vegetation before urban development occurred. Around **350 GL** of stormwater was generated in 2015/16.

Sewage is the waste that drains from household and industrial areas once the water has been used. The volume of sewage is strongly influenced by water consumption. We currently treat approximately **350 GL per year** of sewage.

Desalination is the removal of salt from sea water. The Victorian Desalination Project provides rainfall independent drinking water for Melbourne. Our desalination plant can deliver **150 GL per year** to our customers, which is one third of our demand.





Integrated approach to planning

Water for Victoria supports a new way of bringing together different aspects of the water cycle to better deliver services as our cities grow and change, called integrated water management.

Through integrated water management, water services will be delivered to provide benefits in a range of areas that will make our cities and towns more resilient and liveable.

Water's role in resilient and liveable cities and towns



Safe, secure and affordable supplies in an uncertain future



Effective and affordable wastewater systems



Effective stormwater management protects our urban environment



Healthy and valued urban landscapes



Community values reflected in place-based planning

(Source: *Water for Victoria*, 2016)

The benefits of integrated water management will be felt across Melbourne.

To consider the benefits of an integrated water management approach, we have mapped some of the opportunities we are already investigating, see Figure 16. This shows the areas where we need to consider more than just water supply in assessing the best water servicing solutions, including healthy and valued urban landscapes and effective stormwater management.

In *Water for Victoria*, the Government sets out a new integrated water management planning framework that will guide the development of place-based integrated water management plans. These will be developed through broad scale integrated water management forums that will include representatives from various agencies to ensure the link between urban planning and water management is captured to ensure the delivery of community benefits.



Action:

Actively support the Department of Environment, Land, Water and Planning in the formation and delivery of integrated water management forums and lead the development of place-based integrated water management plans.

Integrated Water Management Opportunities

Legend

- Yarra Valley Water (YVW) Boundary
- City West Water (CWW) Boundary
- Western Water (WW) Boundary
- South East Water (SEW) Boundary
- Urban Growth Area
- Water Reservoirs
- Greenfields Growth Areas
- Existing water networks are constrained
- Existing sewer networks are constrained
- Existing stormwater systems are constrained or high value waterways are to be protected
- Amenity improvement opportunity or cultural values to be protected

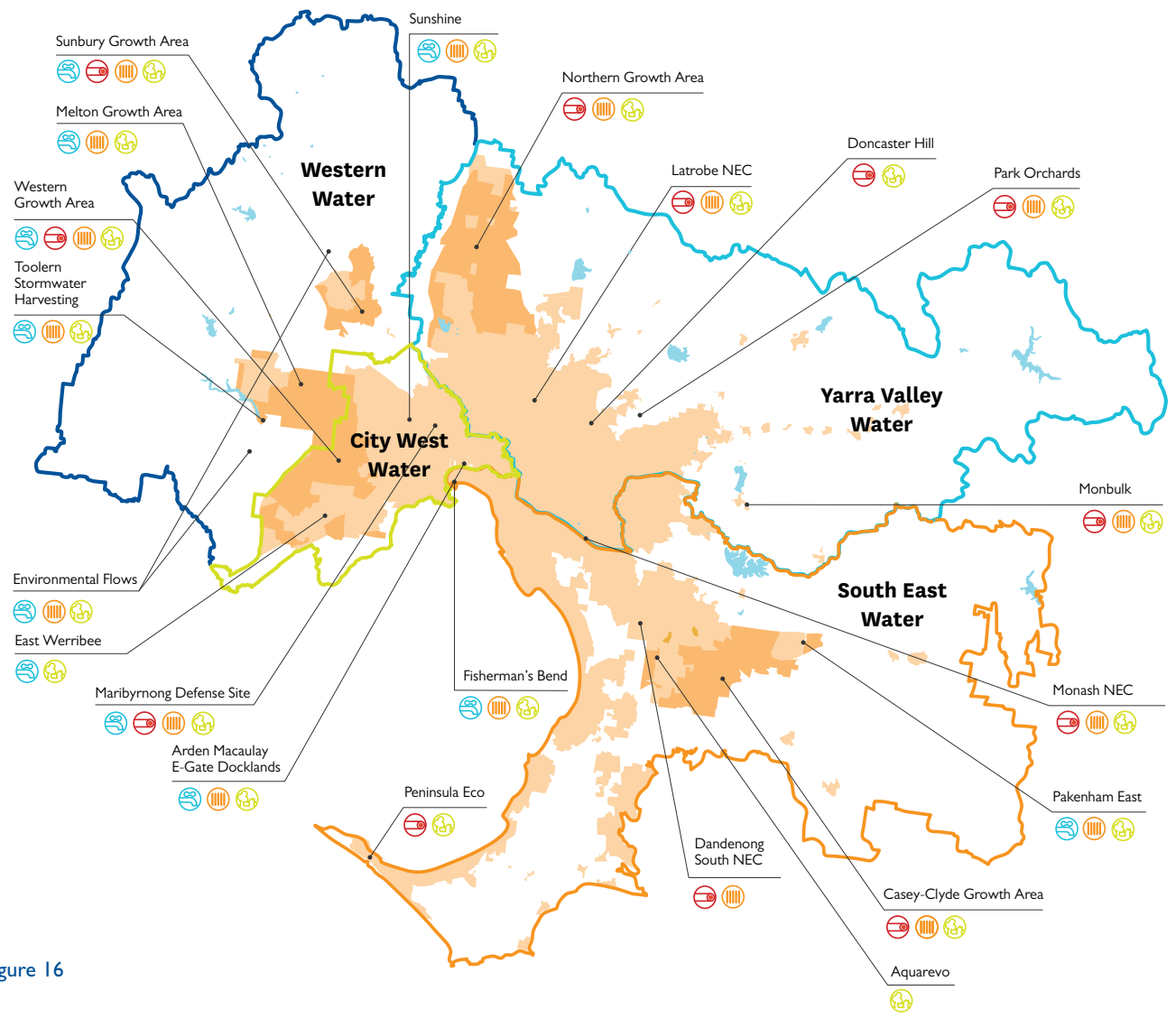


Figure 16



Collaborative Research Centre for Water Sensitive Cities (CRCWSC)

Using the best research is an important part of making our water portfolio work well for us. The CRCWSC was established in July 2012 to help change the way we design, build and manage our cities and towns by valuing the contribution water makes to economic development and growth, our quality of life and the ecosystems of which we are a part.

The metropolitan water corporations are contributing partners with the CRCWSC and have ongoing participation in both research activities and the development of on-ground solutions. The CRCWSC has developed a Water Sensitive Cities Index and as contributing partners we were able to benchmark Melbourne.

What is the Water Sensitive Cities Benchmark?

One way that Greater Melbourne has demonstrated its commitment to delivering on water for people and liveability is by looking to the vision of a water sensitive city.

What is a water sensitive city?

A water sensitive city is one that is sustainable, liveable, productive and resilient through efficient and effective management of water resources through holistic planning.

The vision of a water sensitive city is one that has global traction and was developed here in Australia. The pathway to becoming a water sensitive city is long and has several stages that cities can pass through along the way. These stages show how the city is progressing by moving beyond traditional water services to consider healthy environments, people and places.

Greater Melbourne has been benchmarked on its performance as a water sensitive city and are doing very well. The results below in Figure 17 and 18 show that while our infrastructure for water supply, sewerage and drainage are doing well, we need to do more work to help our communities understand our water system. There are also opportunities to strengthen the governance around integrated water management. These results are aligned to the actions we have identified throughout this document and by implementing these we will move Melbourne towards a more water sensitive city.

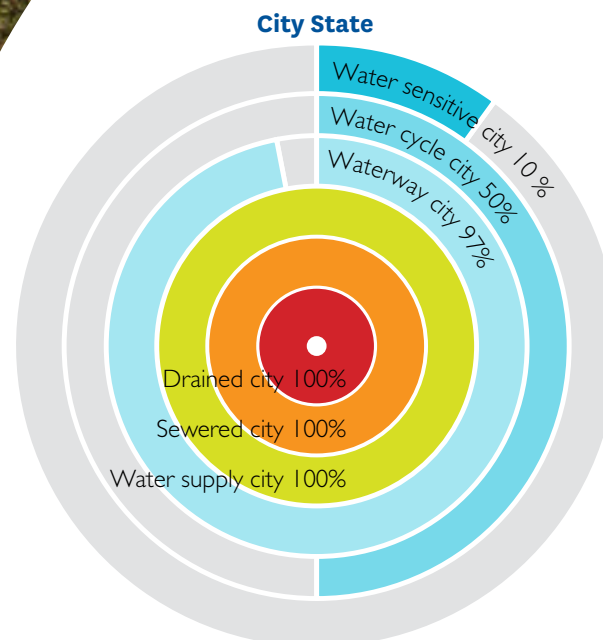


Figure 17: Benchmarking results for Greater Melbourne

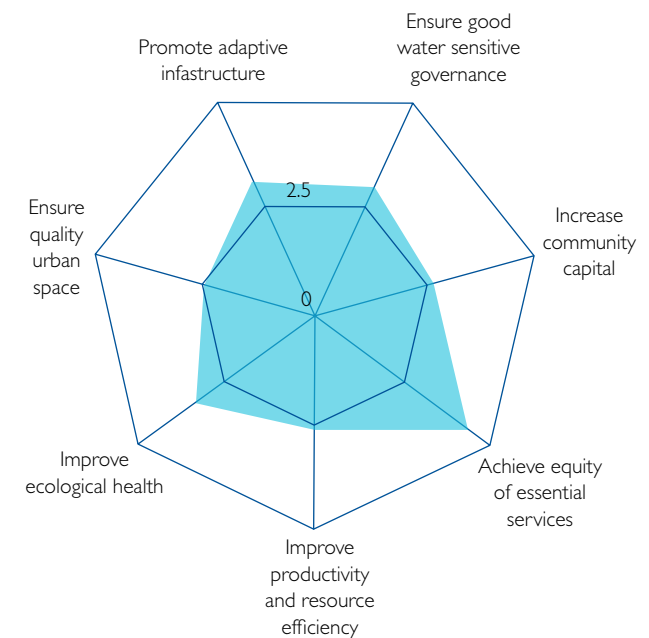


Figure 18: Performance against water sensitive goals

Servicing Sunbury and Melton

Sunbury, Melton and surrounding suburbs are part of the urban growth boundary (as highlighted in Figure 16), as documented in *Plan Melbourne*. Water, sewer and recycled water services are provided by Western Water. Through the development of the *Melbourne Water System Strategy* we have worked closely with Western Water to understand the future requirements for these new suburbs of Melbourne and the broader interconnected systems on the Melbourne supply system.

The Melbourne water grid provides a connection to Sunbury and Melton from the Greater Yarra-Thomson system. Western Water also has access to local water storages managed primarily by Southern Rural Water. Recycled water is generated at seven recycled water plants owned by Western Water.

By 2067, the Western Water population is forecast to almost quadruple. The majority of this growth is planned for the Sunbury and Melton regions. Population growth, coupled with reduced local yields - which have been significantly impacted by climate change and farm dams - means supplies from the Melbourne water grid will be the primary drinking water source.

Despite previous investments in water efficiency and alternate sources of water, servicing these new suburbs will require us to optimise and extend the Melbourne water grid. Western Water will need to collaborate with the Department of Environment, Land, Water and Planning and Melbourne Water to increase the movement of water resources across the grid into the growth areas in Melbourne's west. The water grid and the associated market are important to enable a high level of water supply reliability into the future.

Urban growth in Melbourne's west is located in the upper reaches of the Maribyrnong, Werribee and Kororoit Creek catchments. Without appropriate management, these waterways could be significantly impacted by urbanisation.

Urbanisation will increase the generation of alternate water resources such as stormwater and recycled water. The volume of alternate water is estimated to be up to twice the total urban water demand. By 2067, 30 GL of recycled water is forecast to be generated within the region.

Increasing the use of alternate water for viable urban, agricultural and environmental uses is important under all future scenarios. Western Water will work with stakeholders and the community to better utilise alternate water. The feasibility of the Western Irrigation Network – to support existing and create new agricultural precincts, environmental flows and potable substitution – will be assessed. Interconnection into the metropolitan bulk sewage network will also be pursued in order to manage excess recycled water.

Western Water is responding to these challenges through an integrated system approach. This approach enables the resilience of the system to be assessed to support investment decisions that are flexible for a range of climate and population scenarios.

Western Water's *Urban Water Strategy* provides more specific details of the challenges and opportunities particular to their local community. Please visit Western Water's website.

MAKING APPROPRIATE INVESTMENTS



To ensure we have enough water for all our needs, we need to make sure that we are choosing the right options.

Decision making is often a complex process. There are various community-wide benefits and costs related to each investment and it is important to demonstrate value consistently. For example, green parks and gardens are generally good for the health and wellbeing of the community, but it can be difficult to assign an exact value to those benefits that can be used in evaluating water servicing options.

We consider water-related investments in an integrated way.

Through the *Melbourne Water System Strategy* and *Urban Water Strategies*, we are establishing an investment evaluation framework to support future investment, especially in alternative water projects. The framework provides a consistent set of guidelines as well as input assumptions developed in consultation with the metropolitan retail water corporations, Melbourne Water and the Department of Environment, Land, Water and Planning.

This framework will make sure that any investments continue to provide water for our core needs while maintaining the lifestyle and environment we enjoy.





Investment Evaluation Framework – what are we trying to achieve?

WHY »

Provide evaluation of all options to ensure whole of community costs, benefits and outcomes are considered

To ensure all aspects of water cycle including environment and liveability are captured

Transparency between all entities

WHAT »

Provide a consistent understanding and approach of how we value the water cycle and environment and liveability across the water industry

HOW »

Have consistent assumptions for direct and indirect costs and externalities

Joint ownership of the framework between entities

Periodic review of input assumptions and approach

» Action:

The water industry will consider all of the benefits of alternative water projects when developing business cases based on the scenarios from the *Urban Water Strategies* and will work to ensure alignment of implementation across the industry.

The industry will quantify further benefits on liveability outcomes and health benefits and review the principles of retail recycled water and stormwater pricing by 2019 for inclusions in business cases.

Optimising the water grid and markets

Our water supply system has developed over the years to meet the needs of our communities in Melbourne and the surrounding region. Local, regional and state-wide water supply systems operate both independently and together to allow water to be moved from where it is captured and stored to where it is needed – we call this interconnected system the water grid. Some recent investments in the water grid include:

- Western Water connecting to the Melbourne water system to supplement local supplies
- Sugarloaf (North-South) Pipeline enabling a portion of the water saved through improvements in irrigation systems in northern Victoria to be transferred to Melbourne during critical times
- the Melbourne to Geelong Pipeline enabling supplemental supplies from Melbourne
- the Victorian Desalination Project, which has provided a rainfall independent source of up to 150 GL per year to build drought resilience for Melbourne and the surrounding region and provide for a growing population.

These investments have enhanced water availability across Victoria, ensuring that available water resources can be shared between users in a way that's flexible and adaptive. *Water for Victoria* announced a new grid oversight function to ensure the community gets the best outcomes from the investments in the water grid.

Water markets have been in place for many years in northern Victoria, and are very effective as an enabler of volumetric and financial transactions that support water transfers across the water grid – moving water flexibly around the region to wherever it is needed most at a given point in time. These grid transfers can occur either through the physical transfer of water from one place to another, or as virtual transfers of water delivered through water accounting processes without actually physically transferring any water. The water grid and water markets allow us to optimise our portfolio of water resources over the longer term – ensuring water is available when and where it is needed most.

Water for Victoria outlines a major new initiative: a five year trial beginning in 2017 to develop a new water market in south central Victoria to enable these transactions to occur.



Action:

We will support the Department of Environment, Land, Water and Planning in the south central market trial and the development of the grid oversight function.



Adding capacity to the water grid

As part of investing appropriately we continue to manage our system by taking an integrated water management approach to considering and implementing options that delay the need for augmentations of the main water supply system. This includes water efficiency programs, alternative sources of water; and minor enhancements of the drinking water supply system.

However, it is possible that within the next 50 years, one or more augmentations of the water supply system may be necessary. Under a medium climate change scenario and medium population growth scenario, we may need to augment Melbourne's water supply system in the 2040s.

All possible options for augmenting the water supply system have advantages and disadvantages. Further evaluation of these will be required in coming years with Department of Environment, Land, Water and Planning and other stakeholders. However, it currently seems likely that seawater desalination plants will be a key option for further evaluation. In particular, much of the existing Victorian Desalination Project infrastructure has already been sized to accommodate an additional 50 GL per year of capacity, which suggests that increasing the capacity of the Victorian Desalination Project should be among the first options considered when a future augmentation is needed.



Action:

Evaluate long-term water supply options that could supply water to Melbourne and the surrounding region, taking into consideration community preferences.



KEY ACTIONS TO DELIVER ON THIS VISION



In order to deliver on the vision of this document and *Water for Victoria*, the metropolitan water industry will continue to work collaboratively on actions identified throughout this document:

- 

Customer needs and expectations
- 






Innovative and resilient system
- 

Adaptive management
- 

Climate change and variability
- 

Making appropriate investments

Table 2 Summarised list of actions

Focus Area	Action
	Continue to engage with the community to ensure we reflect their needs and expectations in our water supply planning.
	We will work collaboratively across the water sector to develop long-term, meaningful relationships with the Traditional Owners in the metropolitan region to better integrate cultural water needs into water resource management, and ensure their contribution to the future of water management. We aspire to create relationships and actions that enable the co-design, co-development and co-management of water resources.
	Deliver the <i>Melbourne Sewerage Strategy</i> by 2018.
	Publish the water outlooks to meet community expectations to be more proactive, engaging and accessible.
	Ongoing engagement with the community of the value of our water supply system to provide understanding and build confidence and trust in the services we provide both now and in the future.



Focus Area	Action
	Review the <i>Drought Preparedness Plan</i> every five years and work with councils to identify priority public assets to meet liveability outcomes by March 2018.
	Undertake a leadership role for Victoria by exploring net zero emissions by 2030.
	Review the desalinated water order process in consultation with the Department of Environment, Land, Water and Planning to ensure alignment with adaptive planning by September 2017.
	Actively support the Department of Environment, Land, Water and Planning in the formation and delivery of integrated water management forums and lead the development of place-based integrated water management plans.
	We commit to supporting the efficient use of water across the community. By 2022, we forecast demands of: - 230 litres per person per day for total drinking water use across Melbourne - 150 litres per person per day for residential drinking water use across Melbourne Performance against these forecasts and any actions needed to keep observed demands consistent with these forecasts will be published each year in the <i>Water Outlook</i> .
	We forecast 25 GL per year of alternative water by 2065 in line with our current plans. Our aim is to contribute up to a further 40 GL per year where business cases demonstrate value to our communities.
	We will support the Department of Environment, Land, Water and Planning in the south central market trial and the development of the grid oversight function.
	The water industry will consider all of the benefits of alternative water projects when developing business cases based on the scenarios from the <i>Urban Water Strategies</i> and will work to ensure alignment of implementation across the industry. The industry will quantify further benefits on liveability outcomes and health benefits and review the principles of recycled water and stormwater pricing by 2019 for inclusions in business cases.
	Evaluate long-term water supply options that could supply water to Melbourne and the surrounding region, taking into consideration community preferences.
	Continue to work collaboratively across the industry to assess the benefits of digital metering for our communities.
Implementation	Implement an industry working group to oversee the implementation of the actions set out in this plan and report progress through the <i>Water Outlook</i> .





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